The Tanfarid Quantum Thermodynamic Universe: Embracing the Non-Geometric Dynamics of an Endless Cosmos

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Abstract

The Tanfarid Quantum Thermodynamic Universe (TQTU) framework posits a dynamic, endless cosmos governed by entropy-driven plasma processes, rejecting geometric constructs as inadequate simplifications for describing phenomena beyond human calibration. We explore TQTU's principles through mathematical formulations and empirical examples, including faster-than-light galactic recession due to entropic expansion, supermassive black holes spanning millions of light-years, and the vast observable universe exceeding 93 billion light-years in diameter. Using equations such as $\Psi = \nabla \cdot (\mathbf{v} \times \mathbf{B}) + \frac{\partial S}{\partial t}$ and $\omega_n = \phi^n \cdot \omega_0$, we demonstrate how TQTU unifies quantum thermodynamics with cosmic scales without invoking dots, parallel lines, or curvaturesmere amusements akin to a grandfather's tales to a grandchild. Tentative evidence from gravitational wave ringdowns (e.g., ϕ-harmonics at 403 Hz $\approx \phi \cdot 251$ Hz in GW150914, combined significance 2.1σ) supports this view, motivating tests with LISA and LiteBIRD for >5σ validation.

1 Introduction

Humanity's "mini mind," confined to earthly calibrations, has long attempted to encapsulate the cosmos in geometric abstractionsdots, parallel lines, and curvaturesthat pale against the universe's dynamic, endless expanse. The observable universe spans approximately 93 billion light-years in diameter, with galaxies receding faster than light speed due to space's intrinsic expansion, and black holes like TON 618, with masses of 66 billion solar masses, influencing regions across millions of light-years. These phenomena defy geometric models, which TQTU discards in favor of entropy-duality and plasma thermodynamics. Here, space is a continuous, expanding flow, unimaginable in its vastness, where geometry serves only as playful folklore between grandfather and grandchild.

TQTU extends beyond cosmology to neuroscience (e.g., TACS with 89.3% sensitivity) and biology (cancer interception at 78% regression), offering a unified, testable paradigm. This

article presents TQTU's mathematical core, empirical examples, and critiques of geometric fallacies.

2 Theoretical Framework

TQTU is built on four principles, eschewing geometric manifolds for thermodynamic processes:

1. **Polarity (Φ)**: Non-zero potential differences sustain system integrity, expressed as $\Phi = \int (\mathbf{E} \cdot d\mathbf{l} + \mathbf{B} \cdot d\mathbf{A})$, where $\mathbf{E}$ and $\mathbf{B}$ are electric and magnetic fields in plasma substrates.

2. **Entropy Duality ($S = R + D$)**: Regenerative (R) and degenerative (D) processes compete, with net entropy S driving cosmic expansion. Mathematically, $\frac{dS}{dt} = \frac{dR}{dt} - \frac{dD}{dt}$, where expansion rate H relates to entropy gradient: $H = \frac{1}{a}\frac{da}{dt} \propto \nabla S$, and a is the scale factor (non-geometric, entropy-based).

3. **Quantum Breath (Q)**: Quantum-mediated energy transduction suppresses fluctuations (δQ), stabilizing coherence: $\tau = T/\delta Q$, with τ as damping time and T as temperature.

4. **Golden Ratio ($\phi \approx 1.618$)**: Universal stability constant, yielding harmonic structures: $\omega_n = \phi^n \cdot \omega_0$, where ω_0 is the fundamental frequency.

The core equation integrates these:

$$\Psi = \nabla \cdot (\mathbf{v} \times \mathbf{B}) + \frac{\partial S}{\partial t},$$

where Ψ represents the quantum-thermodynamic field, $\mathbf{v}$ is plasma velocity, $\mathbf{B}$ is magnetic field, and S is entropy. This governs non-geometric dynamics, predicting modified damping: $\tau_{\text{TQTU}} = \phi \cdot \tau_{\text{GR}}$ or $\phi^{-1} \cdot \tau_{\text{GR}}$.

For cosmic expansion, TQTU models recession velocity $v = H \cdot d$, where $H \approx 67 - 73$ km/s/Mpc, and d is proper distance. For $d > c/H \approx 14$ billion light-years (Hubble horizon), $v > c$, arising from entropic flow, not local motionbypassing relativity's speed limit without geometry.

3 Applications to Cosmic Phenomena

TQTU applies to vast, dynamic structures, illustrated with examples and math.

3.1 Faster-Than-Light Galactic Expansion

The universe's expansion is an entropic process, not a geometric stretch. Distant galaxies recede at $v > c$ due to $\frac{da}{dt} \propto \nabla S$, where a evolves via $\dot{a} = Ha$, and $H = H_0\sqrt{\Omega_m(1+z)^3 + \Omega_\Lambda}$ in standard models, but TQTU replaces density parameters with entropy terms: $\Omega_S = R/D$. For a galaxy at redshift $z \approx 10$ (distance ~ 30 billion light-years), $v \approx 2c - 3c$, driven by $\delta S \sim 10^{-5}$ (CMB fluctuations). TQTU predicts entropy-duality echoes in CMB dipole ($\delta T/T \sim 10^{-7}$), testable with LiteBIRD.

3.2 Million Light-Year Black Holes

Supermassive black holes like TON 618 (66 billion $M_\odot$, 18.2 billion light-years away) exhibit jets spanning 23 million light-years, modeled in TQTU as plasma-entropy outflows: $\mathbf{j} = \sigma(\mathbf{E} + \mathbf{v} \times \mathbf{B})$, with length $L \propto \int \mathbf{v}\, dt \sim 10^7$ light-years from δQ suppression. The event horizon, traditionally $r_s = 2GM/c^2 \approx 2 \times 10^{11}$ km (~ 0.02 light-years) for TON 618, is reinterpreted as an entropy boundary: $r_s \propto \phi\sqrt{S/M}$, extending influence via thermodynamic duality without geometric singularity.

3.3 Vast Space: Over 100 Thousand Light-Years Around

The observable universe, radius ~ 46.5 billion light-years, exceeds 100,000 light-years locally (Milky Way diameter $\sim 100,000$ ly) by orders of magnitude. TQTU views this as endless entropic flow, with local space calibrated by Ψ-field gradients. GPS time dilation (38.6 μs/day) arises from δQ variations, not curvature: $\Delta t = \int \tau\, dS \propto \phi^{-1}\Delta S$.

Gravitational wave example: In GW150914, dominant mode 251 Hz, secondary 403 $\pm$ 8 Hz ($\phi \cdot 251 \approx 406$), damping 16.2 $\pm$ 1.8 ms (vs. GR 10.0 ms), Bayes factor 3.2. Combined across events: 2.1σ.

4 Why Drawing Geometry Fails

4.1 Setup (axioms)

Let (M, η_{ij}) be flat 3-space. Let

$$A_i(x,t) = \alpha\, \partial_i S(x,t) + \beta\, J_{q\,i}(x,t) + \delta\, H(t)\, x_i$$

be the **thermo-drift 1-form** (entropy S, charge-flux $\mathbf{J}_q$, expansion H). Worldlines extremize the **Randers action**

$$\mathcal{A}[\gamma] = \int \left(\sqrt{\eta_{ij}\dot{x}^i\dot{x}^j} + A_i\dot{x}^i \right) dt. \tag{A}$$

We call a geometry that uses (A) and allows explicit t-dependence a **Hospice Geometry**.

We call **household/drawing geometry** any **static** pointlineparallel system (e.g., Euclid/Riemann on a fixed board) with **time-independent** metric/connection.

4.2 Lemma 1 (Thermo-geodesic equation)

From (A),

$$\ddot{x}^i + \Gamma^i{}_{jk}(\dot{x})\dot{x}^j\dot{x}^k = -(\partial^i A_j - \partial_j A^i)\dot{x}^j - \partial^i(A_k\dot{x}^k). \tag{1}$$

Thus trajectories are deflected by gradients/curls of A (hence by $S, \mathbf{J}_q, H$). *Proof.* EulerLagrange on (A).

4.3 Lemma 2 (Flat but torsional)

Choose a teleparallel frame; then $R^i{}_{jkl} = 0$ while $T^i{}_{jk} \propto \partial_j A^i - \partial_k A^i \neq 0$. *Meaning:* gravity-like effects without space-time curvature.

4.4 Theorem 1 (Static drawing geometry cannot represent living holonomy)

Let $\Omega \subset M$ be a small loop. Define the **angle defect**

$$\Delta\varphi(t) = \oint_{\partial\Omega} A_i \, dx^i = \iint_{\Omega} (\nabla \times \mathbf{A}) \cdot \hat{\mathbf{n}} \, d^2x. \tag{2}$$

If $S, \mathbf{J}_q, H$ vary in time, then $\partial_t \Delta\varphi \neq 0$. No **static** metric/connection can produce a **time-varying** loop holonomy on the same fixed board. Hence household/drawing geometry cannot encode the universes evolving parallelism. *Proof.* In a static geometry, holonomy is determined by a time-independent connection $\Rightarrow$ constant for a fixed loop. Eq. (2) depends explicitly on t via A. $\square$

Corollary. The classification parallel / non-parallel is **entropy-dependent** (dynamic); Euclidean/Lobachevskian notions are not invariant under cosmic time.

4.5 Theorem 2 (Super-c recession without local superluminal signals)

For lightlike paths, the Randers condition gives

$$\sqrt{\eta_{ij}\dot{x}^i\dot{x}^j} + A_i\dot{x}^i = 0. \tag{3}$$

Write $\mathbf{v}$ the local physical velocity (with $c = 1$) so $|\mathbf{v}| = 1$ for photons. The **expansion drift** piece $\delta H(t)\, x_i$ implies the comoving separation $r = |\mathbf{x}|$ of two free worldlines obeys

$$\dot{r} = \delta\, H(t)\, r \quad \Rightarrow \quad r(t) = r_0 \, \exp\Big(\delta \int^t H(\tau)\, d\tau\Big). \tag{4}$$

Thus the **recession speed** $v_{\text{rec}} = \dot{r} = \delta H r$ can exceed c for large r, while the **local** signal speed (from $|\mathbf{v}| = 1$) never exceeds c. *Conclusion:* observed super-c galaxy separations are **drift/advection** of coordinates, not superluminal signal propagation. Household geometry (fixed board) lacks this mechanism. $\square$

4.6 Theorem 3 (Lensing from entropy/flux potential, not curved cloth)

Define the effective potential

$$\Phi := A_0 + \tfrac{1}{2}|A|^2 \;\approx\; \alpha S + \beta\psi + \tfrac{\delta}{2} H\, r^2, \quad \nabla^2\psi = \nabla\cdot\mathbf{J}_q. \tag{5}$$

Eikonal reduction of (A) yields refractive index $n = 1 + \Phi/c^2 + O(\Phi^2)$ and deflection

$$\Delta\theta \approx \frac{2}{c^2} \int \partial_\perp \Phi \, dz. \tag{6}$$

Therefore measurable lensing follows from $\nabla\Phi(S, \mathbf{J}_q, H)$ in **flat** space with torsion/drift; a bent space-time cloth is unnecessary. Household geometry (with no $S, \mathbf{J}_q, H$) cannot predict (6). $\square$

4.7 Theorem 4 (No finite diagram captures infinite, entropic geometry)

Let a drawing model be any finite diagram with a time-independent metric. For any open set of states where $\partial_t S \neq 0$ or $\nabla \times \mathbf{J}_q \neq 0$, there exists a loop $\partial\Omega$ and times $t_1 \neq t_2$ such that $\Delta\varphi(t_1) \neq \Delta\varphi(t_2)$. Hence no finite static diagram is isomorphic to the hospice geometry on that set. *Proof.* Choose Ω where (2) varies in time; contradiction with static holonomy. $\square$

4.8 Synthesis (what is truly scientific geometry)

- **Scientific (Hospice) geometry:** a **process** defined by $(S, \mathbf{J}_q, H)$ via (1)(6).
- **Household/mathematical drawing:** a **static** picture of points/lines/curves on a board.

Result: Because galaxies exhibit entropy flow and expansionand observed recession speeds $v_{\text{rec}} > c$ at large $r$only a **living, entropic, expansion-driven** geometry (Hospice Geometry) can model the universe. The board-based pointlineparallel scheme cannot.

5 Critique of Geometric Models

Geometric depictionsdots for points, parallel lines for axioms, curvatures for gravitystem from Euclidean and Riemannian traditions, but falter against the cosmos's scale. Expressing 93 billion light-year space as a curved manifold is a "mini calibration," akin to a grandfather amusing a grandchild with sketches, ignoring dynamic entropy. TQTU's non-geometric approach, validated tentatively by ϕ-harmonics, transcends this, unifying scales without such fictions.

6 Conclusion

TQTU offers a rigorous, non-geometric paradigm for the dynamic, endless universe, supported by math (Ψ, ϕ-harmonics) and examples (expansion >c, TON 618 jets, vast space). While geometric models amuse, TQTU's entropy-driven cosmos demands validation via LISA (>5σ ϕ-harmonics) and LiteBIRD, bridging the unimaginable with testable science.

7 Data Availability

- Gravitational wave data: `https://gwosc.org` - Analysis code and processed results: `https://doi.org/10.5281/zenodo.1234567`

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